SPECIAL REPORT

Survey of Cytological Facilities in Canada

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IN view of the rapid expansion of cytodiagnostic facilities in Canada and their increased utilization, the Canadian Society of Cytology has recently undertaken a survey of these facilities. The results of this survey are presented in this paper, together with individual reports prepared by some of the provincial advisers responsible for gathering the data.

The previous survey of Canadian cytological facilities was published in *The Canadian Medical Association Journal* in 1966[1] and covered the years 1962 to 1964 in detail. The present report is concerned with the years 1965 to 1967 inclusive.

METHOD

A model questionnaire was sent to the regional advisers of the Canadian Society of Cytology in each province with the request that a copy of the questionnaire be sent to every hospital known to be providing cytological services in the area for which he was responsible. Wherever private laboratories were known to be providing cytological services, these were also requested to complete a questionnaire.

The questionnaire was designed to provide an answer to three basic questions:

1. The number and location of cytodiagnostic facilities in each province.

2. The number of cytological examinations performed in the years 1965, 1966 and 1967, classified as to whether these were gynecological or non-gynecological.

3. The number of cytotechnologists employed in Canada and the number of students in training.

In addition the laboratories surveyed were asked to express an opinion regarding the practicability of screening all female hospital admissions for cancer of the cervix. Finally, the extent to which computer technology is being utilized to assist in the compilation of data in cytologic screening programs was determined.

RESULTS

The results of the survey are presented in the accompanying tables; the population figures quoted are those obtained at the 1966 census.

Number of Laboratories Responding to the Questionnaire

Table I records the number of laboratories which completed and returned the questionnaires. Because, in each province, all of the laboratories providing significant cytology services were well known to the regional advisers, it is believed that these figures represent (with well over 90% accuracy) the current picture in Canada. The biggest increases have occurred in the two provinces having the greatest decentralization of laboratory facilities; the number of laboratories providing cytology services increased by over 50% in Quebec and by 30% in

TABLE I.—NUMBER OF LABORATORIES RESPONDING TO QUESTIONNAIRE—1967
(1964 figures in parentheses)

British Columbia	7 (7)
Alberta	18 (11)
Saskatchewan	9 (7)
Manitoba	5 (5)
Ontario	107 (68)
Quebec	98 (47)
New Brunswick	1 (5)
Nova Scotia	9 (8)
Prince Edward Island	1 (1)
Newfoundland	3 (3)
Total	258 (162)

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TABLE II.—GYNECOLOGICAL CYTOLOGY, BY PROVINCES, 1965, 1966 AND 1967

Province	Female population over age 25, 1966 census	Cases examined* (Percentage of women over age 25 in parentheses) 1965		1966		1967	
British Columbia	502,656	184,577	(37)	208,423	(41)	243,132	(48)
Alberta	351,690	77,820	(22)	104,032	(30)	133,432	(38)
Saskatchewan	235,279	32,429	(14)	48,591	(21)	64,388	(27)
Manitoba	252,104	58,313	(23)	72,914	(29)	94,688	(38)
Ontario	1,866,576	251,188	(14)	346,600	(19)	493,413	(26)
Quebec	1,424,193	143,329	(10)	188,078	(13)	225,010	(16)
New Brunswick	144,956	5,500	(est. 4)	13,122	(9)	21,912	(15)
Nova Scotia	188,658	32,054	(17)	43,795	(23)	49,483	(26)
Prince Edward Island	26,289	909	(4)	2173	(8)	3853	(15)
Newfoundland	98,415	3367	(3)	7644	(8)	12,640	(13)
Total	5,090,816	789,486	(16)	1,035,372	(20)	1,341,951	(26)

*Including new cases and repeat examinations.

Ontario. It is likely that this trend toward decentralization will continue as more cytotechnologists and pathologists trained in cytodiagnostic techniques become available.

Gynecological Cytology

Table II lists the total volume of gynecological cytology performed over the years 1965 to 1967, by province; the figures in parentheses give the percentage of women over age 25 which these totals represent. In Table III the figures in parentheses give the percentages of women over age 21. It is of great significance that in the country as a whole we have been able to screen 26% of the female population over age 25 in a 12-month period; this is a tremendous improvement over the situation in 1962 when only 6.3% of the female population over age 25 was screened. Put in another way, the cytodiagnostic resources in the country as a whole are now being utilized to a degree which would allow every woman over age 25 to be screened for cancer of the cervix every four years. The situation in some provinces, however, is better than in others. If it is accepted that the ideal situation is that every woman at risk be screened once every three years, then this situation has already been achieved in British Columbia, Alberta, Manitoba and certain of the large metropolitan areas, notably Toronto.

It was not possible to obtain a precise figure for the number of new cases in a given year, but it is estimated that something like two-thirds of the patients screened in 1967 were having their first cytologic examination, the other one-third being repeat cases who had had a cervical cytology study in some previous year. The ratio of new cases to repeat cases varied from province to province; in most instances only estimates were available.

Non-Gynecological Cytology

Table IV shows that the number of non-gynecological cases examined annually has almost doubled over the three-year period under consideration; approximately 68% of these were pulmonary (sputum or bronchial washing) examinations. The increase in non-gynecological cytology in Ontario is particularly striking and is related partly to the greatly increased number of pathologists taking an active interest in cy-

TABLE III.—GYNECOLOGICAL CYTOLOGY, BY PROVINCES, 1965, 1966 AND 1967

Province	Female population over age 21, 1966 census	Cases examined* (Percentage of women over age 21 in parentheses) 1965		1966		1967	
British Columbia	552,960	184,577	(33)	208,423	(39)	243,132	(44)
Alberta	392,497	77,820	(20)	104,032	(27)	133,432	(34)
Saskatchewan	258,702	32,429	(13)	48,591	(19)	64,388	(25)
Manitoba	277,587	58,313	(21)	72,914	(26)	94,688	(34)
Ontario	2,057,503	251,188	(12)	346,600	(17)	493,413	(24)
Quebec	1,609,865	143,329	(9)	188,078	(12)	225,010	(14)
New Brunswick	160,826	5500	(est. 3)	13,122	(8)	21,912	(14)
Nova Scotia	208,851	32,054	(15)	43,795	(21)	49,483	(24)
Prince Edward Island	28,825	909	(3)	2173	(7)	3853	(13)
Newfoundland	111,991	3367	(3)	7644	(7)	12,640	(11)
Total	5,659,607	789,486	(14)	1,035,372	(18)	1,341,951	(24)

*Including new cases and repeat examinations.

TABLE IV.—NON-GYNECOLOGICAL CYTOLOGY, 1967

Province	*Pulmonary*	*Gastric*	*Urine*	*Serous fluids*	*Misc.*	*1967 total*	*1964 total*	*Increase*
British Columbia	9162			1019	2352	12,533	7518	67%
Alberta	2490	79	135	159	2523	5366	2991	77%
Saskatchewan	2126	60	108	427	458	3179	1894	68%
Manitoba	4274	304	1694	617	1458	8347	6786	23%
Ontario	35,650 approx.					50,865	26,000	96%
Quebec	18,245	1645	2139	2693	1923	26,645	18,457	42%
New Brunswick	941	14	34	167	99	1255	965	30%
Nova Scotia	3177	56	150	347	342	4072	4215	Nil
Prince Edward Island						103	56	84%
Newfoundland	1668	68	69	97	85	1987	528	276%

tology in this province, and partly to the greatly increased number of cytotechnologists working in this province.

The Cytotechnologist Work Force

Table V presents the number of cytotechnologists employed in Canada in 1967 with the figures for 1964 in parentheses. Although there is a striking increase, perhaps even more encouraging are the numbers of students in training—96 in 1967.

TABLE V.—CYTOTECHNOLOGISTS IN CANADA
(1964 figures in parentheses)

Province	*Employed*	*In training*
British Columbia	28 (17)	3
Alberta	28 (11)	11
Saskatchewan	12 (6)	6
Manitoba	20 (18)	10
Ontario	123 (68)	29
Quebec	63 (52)	17
New Brunswick	6 (N/A)	3 in Nova Scotia
Nova Scotia	12 (8)	16
Prince Edward Island	—	—
Newfoundland	5 (3)	1
Total	297 (183)	96

This is almost double the number of students who were being trained in 1964 and represents a very satisfactory response to the deficiency which was felt to exist at the time of the last survey. At the present time there are 12 schools of cytotechnology approved by the C.M.A. Committee on Approval of Training Programs for Medical Technologists.

Screening of Female Hospital Admissions

Sixteen per cent of the hospitals covered by the survey are already screening female hospital admissions for cancer of the cervix; a further 62% stated that they would be in favour of such a program but did not, at present, perform the examination on a routine basis. The remaining 22% were not in favour of routine screening, for a variety of reasons; the most common appears to be the problem of obtaining a specimen from women admitted to non-gynecological services.

The Computer and Cytology

With one or two notable exceptions, computer technology is not being utilized in Canada to help in compiling and assimilating the vast mass of facts and figures which are now accumulating annually. Undoubtedly the next few years will see a great increase in the use of data-processing techniques by hospitals and provincial health services. As and where this course occurs, cytodiagnostic programs will benefit greatly from the increased facility with which information can be stored, compiled and recalled.

CONCLUSIONS

The past five years have seen a significant increase in the utilization of cytodiagnostic techniques in Canada. In 1967, 26% of the female population over the age of 25 were screened for cancer of the cervix; this compares with 6.3% screened in 1962. Improved and expanded training programs for cytotechnologists and pathologists have resulted in a considerably expanded cytodiagnostic work-force, and the time is not far distant when the goal of a cytologic examination every two or three years for every woman at risk, will be reached.

REFERENCE

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APPENDIX

CYTOLOGY IN BRITISH COLUMBIA, 1967

A central cytology laboratory serving the entire province continues to perform over 99% of the cervical smear examinations. Other hospital laboratories, as before, do over 50% of the non-gynecologic cytology.

One of the main purposes of the central laboratory has been the collection of accurate demographic information which is made possible by registering significant data for each woman tested with the

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Provincial Division of Vital Statistics for analysis. All pathologists in the province have assisted by providing the central laboratory with access to all biopsy material resulting from the program. By these means, age, specific incidence and prevalence rates of preclinical and clinical invasive carcinoma of the cervix have been collected in a uniform and thorough manner since 1955. The object of this undertaking is to determine the significance of *in situ* carcinoma by studying the effect of its detection and removal on the incidence and mortality of clinical carcinoma in the total female population in the province.

The results to the end of 1967 show that there has been a steady decline of clinical invasive carcinoma, of the order of 50% in the period from 1955 to 1967,[1] that the rate of generation of clinical carcinoma in the previously screened population is only about 15% of that in the unscreened part,[1] and that the mortality rate is beginning to drop (Table I). The lag period of about 10 years or more between the falling incidence of invasive cervical carcinoma and that of mortality is explained in part by the long natural history of *in situ* disease. If the average duration of preclinical disease is 12 years and the average time from initial treatment to death from invasive disease is 2.5 years, the effect on mortality data from the removal of a case of early *in situ* carcinoma would not be noted for about 15 years.

TABLE I.—CRUDE AND REFINED MORTALITY RATES FOR SQUAMOUS CARCINOMA OF THE CERVIX IN THE PROVINCE OF BRITISH COLUMBIA

Year	Population in thousands over age 20	Crude No. of deaths	Crude Rate 1/100,000	Refined No. of deaths	Refined Rate 1/100,000
1958...	473.0	65	13.5	54	11.4
1959...	478.8	65	13.6	51	10.6
1960...	486.4	50	10.3	48	9.9
1961...	496.0	66	13.3	51	10.25
1962...	503.0	81	16.1	65	12.9
1963...	513.0	60	11.7	57	11.0
1964...	526.8	65	12.3	56	10.6
1965...	543.2	56	10.3	42	7.7
1966...	566.5	66	11.7	44	7.8
1967...	592.4	52	8.8	38	6.4

Correct as of June 1968.

Somewhat over one-third of all women aged 20 years and over are being tested each year. To the end of 1967 about 75% of women now living in the province have been tested one or more times. It has been found difficult to reach the remaining 25%. Improvement is hoped for by urging contributing doctors to take smears on all pregnant patients and to take smears annually on those women who are using contraceptive pills or intra-uterine devices. The testing of all women admitted to hospital would also provide improved coverage, but this service is available only in a few hospitals in British Columbia to date.

It would seem appropriate to point out that the percentages of population shown in Tables II and III of the survey represent figures that are greater than the actual figures. In British Columbia, for example, many smears have been done on women aged 20 years and over, giving a corrected population figure for B.C. of 592,400. In the last column the figure 243,132 represents the number of tests performed in 1967 and not the number of women examined. This latter figure, corrected to exclude cases repeated during the year, is known to be 209,425 women. Using the corrected population and the actual number of women examined, the result is 35% rather than the 48% shown in Table II or the 44% shown in Table III.

It would appear advisable to collect figures on the basis of the population 20 years of age and over, because more of these women are now entering screening programs. Furthermore, in British Columbia the rate of preclinical disease in the third decade has risen from 1.64/1000 in 1960 to 3.40/1000 in 1966. The rates in all other decades have remained stable. The cause for this doubling of the rate in the third decade over a period of six years is not yet apparent and definitely warrants careful investigation of the various factors that might be associated with carcinogenesis.

H. K. FIDLER, M.D., Regional Adviser, British Columbia

REFERENCE

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CYTOLOGY IN ALBERTA, 1967

In the Province of Alberta the annual number of cytodiagnostic examinations of cervico-vaginal smears has risen from only a few thousand cases in 1961 to a volume of 133,432 in 1967. During this period over 2000 histologically proved cases of preclinical carcinoma of the cervix have been diagnosed, treated and "cured".

In 1961, when only a "sprinkling" of cytologic examinations was performed, the development in Alberta was at least 10 years behind that in the Province of British Columbia. By 1967, coverage of the eligible population in Alberta had penetrated the 35% level, which is a level that was achieved in British Columbia only two years previously.

According to the most recent report on National Surveys of Cytologic Facilities in the U.S.,[1] the demonstrated cytodiagnostic capability in the U.S. equates to 26% coverage of the eligible female population over the age of 20. The equivalent figure for Alberta in 1967 was 34%.

This rapid development to a level which should achieve reasonably adequate control of invasive carcinoma of the uterine cervix has been accomplished through the development of a Cytotechnologist Training School at the Department of Pathology, University of Alberta, Provincial Laboratory, Edmonton, as well as by the willingness of pathologists in a number of other laboratories to become significantly involved in cytodiagnosis.

The current need in Alberta is an improvement in the balance between areas of coverage and in the ratio of pathologists to cytotechnologists, since the

critical shortage that formerly existed in the latter category has now been largely overcome.

Other factors requiring additional attention include:

1. Postgraduate training programs for pathologists and pathology residents.

2. Continuing education seminars for practising clinicians.

3. Improved statistical data collection and dissemination on incidence, prevalence, survival rates, death rates, etc., relative to stages of carcinoma of the cervix with cross-referencing through pathologists' laboratories. Improvement is required in both completeness and accuracy of information. Computerized data storage and retrieval may be necessary to accomplish this.

4. Special-project studies properly programed to evaluate "unique" populations, new methods, techniques, etc. (clinically as well as in the laboratory).

5. Identification and penetration of high-risk, highly susceptible groups in the population. Attention of public facilities and laboratories should probably be directed mainly at these groups in the population. Private patients seen in physicians' offices are generally already well covered; and specimens from such patients should probably be referred to consulting pathologists' private laboratories.

T. A. KASPER, M.D.,
Regional Adviser, Alberta

REFERENCE

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CYTOLOGY IN SASKATCHEWAN, 1967

Although cytological examination has been employed as a diagnostic procedure in Saskatchewan's major hospitals for some years, it was not used in extensive screening for early detection of cancer of the female genital tract until January 1964, when funds were made available by the Provincial Government for the setting up and staffing of a central cytology laboratory.

The cytology department accepted its first specimen for examination in January 1964. With continued co-operation and encouragement from the practising physicians throughout the province the volume of work quickly increased. In 1966 approximately 35,000 examinations were carried out, and it soon became evident that expansion of the laboratory was inevitable.

The renovation and expansion of the cytology laboratory took place in 1967. In addition, the new laboratory has facilities for the teaching and training of cytotechnologists. The School of Cytotechnology was officially approved by The Canadian Medical Association and the Canadian Society of Laboratory Technologists in 1967.

In 1967 over 67,000 cytological examinations were performed in Saskatchewan (64,493 gynecological and 3184 non-gynecological cases). This represents an increase of 48% over the total record for 1965. About 80% of the cervical smears (48,752 cases) were examined in the central laboratory, which is located at the Regina Grey Nuns' Hospital.

A data-processing and retrieval technique for gynecological cytology by utilization of a computer was started in 1968 and is in progress.

An educational campaign concerning the value of cytological examinations has started with publication of a pamphlet for the medical profession. Grants for the publication of the pamphlet have been made available by the Saskatchewan Branch of the Canadian Cancer Society.

A sputum cytology screening for men over 40 years of age was started in 1968. For this survey the facilities of the central cytology laboratory are used. The program is maintained by close co-operation between the Saskatchewan Anti-Tuberculosis League and the Saskatchewan Branch of the Canadian Cancer Society.

I wish to acknowledge the help received from all pathologists throughout the province who provided the information contained in this report.

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CYTOLOGY IN ONTARIO, 1967

In the report on cytology in Ontario in 1965 it was emphasized that considerable effort had been concentrated on the development of the basic facilities for extensive cytological examinations of various types, and on a decentralized basis. The statistics for the period from 1965 to 1967 show that the expected major increase in utilization of these facilities did occur, despite the fact that there is no "free" cytology service in Ontario. The total figure for 1967 of 543,589 cytology examinations in Ontario, including 493,413 vaginal cytology examinations, indicates that satisfactory progress is being made. However, this total for vaginal cytology is still short of the 1,000,000 examinations per year which one may consider optimal for satisfactory coverage (once every three years) of the female population over the age of 21 years in the Province of Ontario. There is variation in utilization of the facilities in the various centres in the province, but several urban areas have now reached a satisfactory level. In Metropolitan Toronto the volume of 250,000 vaginal cytology examinations in 1967 is equivalent to approximately one-third of the total adult female population in this city. This volume for Metropolitan Toronto alone (with approximately 10% of Canada's population) constitutes 18.5% of all vaginal cytology in Canada and exceeded the total volume for any province, excluding Ontario.

Continued emphasis has been placed on the development of non-gynecological cytology, and on the development of the various types of cytology service on a local basis in order that routine cytology may be available to patients wherever active-treatment hospitals are located. There is continuing development of teaching facilities in cytology in the areas of the five medical schools in the province. However, there is much remaining to be accomplished

TABLE I.—PROGRESS OF CYTOLOGY IN ONTARIO

	1961	1964	1967	
	Ontario	Ontario	Ontario	Metro. Toronto only
Total cases examined (all types)	46,000	180,500	543,589	(274,617)
Total cases examined (vaginal)	36,000	155,500	493,413	(249,964)
No. of laboratories providing facilities for cytology	43	68	112	(36)
No. of laboratories with annual volume in excess of 2000 cases per year	8	26	59	(23)

in the development of postgraduate medical training, and in the provision of ample supervised apprentice-type training for cytotechnologists after completion of didactic instruction.

Special projects, such as the oral cytology service for dentists which was begun in 1964, are proceeding satisfactorily. Approximately 40% of dentists are using this service for assessment of equivocal or relatively innocuous-appearing oral mucosal lesions which they may encounter incidentally.

The routine pattern of combining cytohormonal assessment of vaginal cytology samples with screening for malignancy has allowed an extensive accumulation of information pertinent to the effects of the use of oral contraceptives in the population of Ontario. Similarly, the careful categorization of degrees of apparent dysplasia has allowed opportunity for a very extensive assessment of the progress and pathogenesis of premalignant cervical lesions.

Two of the problem areas evident in the continuing survey of statistics in Ontario are: (a) the difficulty of documentation of the correlation of the final histological findings with the cytological assessment of abnormalities, and (b) the rather slow development of the routine screening of all female medical and surgical patients while in hospital.

The major support given to the development of cytology by the Ontario Cancer Treatment and Research Foundation is acknowledged. The extensive postgraduate training of pathologists, the didactic training of cytotechnologists and the various research projects—e.g. the sputum cytology of cigarette smokers, the significance of circulating tumour cells, the use of the vaginal cytopipette and various projects in cytogenetics—would not have been possible without the generous aid of the Foundation.

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CYTOLOGY IN QUEBEC, 1967

Our survey shows an increase in the volume of cytology examinations. Vaginal cytology increased 31% in 1965, approximately 40% in 1966 and approximately 20% in 1967. As the minimum interval for screening for early detection of cervical cancer is three years, we would require at least 536,000 examinations yearly, based on the female population over the age of 21, according to the 1966 census. The figure of 225,010 for 1967 is therefore far below the minimum desirable figure. It is also disquieting that the 1967 increase was only 20%, in contrast to the increase of 40% in 1966. One must also note that the 225,010 examinations included approximately 10% of repeat examinations (repeat examinations in the country-wide survey were estimated as one-third of the total).

How can we obtain the desired increase in volume?

1. As we mentioned in our 1964 survey, cytology examinations are paid for by the Quebec Hospital Insurance Service. The failure to attain the required level of cytology examinations is therefore not caused by any financial consideration, at least as far as the patient is concerned.

2. There is a definite need for education of both general practitioners and specialists in the advantages of cytology. Similarly, training in cytology should be a requisite for all pathology residents. Only eight out of the 15 pathology departments reported that they give training in cytology. These eight laboratories had 13 pathology residents.

3. There is also a need for routine screening in female hospital admissions over the age of 21. Our survey showed that out of 59 returned questionnaires, only 21 reported routine cytology examination of all admissions, and of the remaining 38, 17 were not in favour of such a routine procedure.

4. The need for more cytotechnologists is clearly recognized. The number increased only approximately 20% in the years 1964 to 1967, while the country-wide average increase was 60%. Our survey showed an urgent need for 34 cytotechnologists and reported only 17 trainees. We are now in the process of establishing three new cytotechnologist training schools: one associated with the University of Montreal, one with the University of Sherbrooke and one with the Pathology Institute at McGill University. Urgent governmental assistance is essential in order to expedite the functioning of these training schools.

Our survey showed that only a very small number of cytology laboratories carry out any research at all, only seven of the 59 from which questionnaires were returned. This failure seems to be due to the lack of sufficient cytopathologists, which again points to the necessity for more generalized and efficient training in cytology.

With any further increase in cytology examinations, the need for computer service is self-evident. These services are indispensable for the integration of the cytological, pathological and clinical features; they are also needed to keep track of the intervals between individual examinations, to select those cases which require more frequent examinations, and at the same time, to prevent the overloading of facilities by unnecessarily frequent examinations.

Computer facilities can also be used for the compilation of incidence, prevalence, morbidity and mortality statistics and for research projects.

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CYTOLOGY IN NEWFOUNDLAND, 1967

Cytologic examinations have increased greatly in number over the past three years. At present there are six hospitals in Newfoundland with laboratories providing cytologic facilities. These are scattered over the province—three in the eastern part, two in Central Newfoundland and one in the west. These laboratories cover the needs of the immediate geographical area in which they are located.

The tremendous increase in non-gynecologic examinations is related to the number of physicians who use cytology as a diagnostic aid in hospitalized patients.

Screening for uterine carcinoma is still far from complete. The number of women aged 20 years and over is 116,000 according to the Canada Census, 1966. There are now five cytotechnologists in the province and six are being trained. The shortage of cytology workers is therefore obvious. When the full potential of our available personnel is used, however, our screening capability should be in the vicinity of 25,000 women, and when the six trainees are qualified this number should rise to 55,000 women.

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VIEWPOINT

Oral Contraceptives and Cervical Atypia:
A Plea for Objective Appraisal

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RECENT controversy concerning the possible effects of oral contraceptives on cervical epithelium has clearly indicated that this problem requires responsible assessment and comment. This is particularly so since the subject is so readily given prominence in the lay press and emotional factors and religious opinions may exert an effect to a degree not usually encountered in the discussion of medical matters.

Perusal of "preliminary" or "tentative" reports or inadequately documented "impressions" on the effects of oral contraceptives indicates that certain basic factors relating to cervical atypia and the interrelationships of statistics are on occasion being ignored.

Some reports have indicated that there is an increase in cervical epithelial atypia in younger women who are on oral contraceptives. There are several reasons why it may be quite misleading to suggest a cause and effect relationship between these two factors without careful analysis of the statistics.

It has long been established that there is an increased risk of cervical dysplasia and cervical squamous cancer in women with a background of repeated pregnancies, particularly pregnancies in the earlier reproductive years, and in women who are seen in special treatment clinics and who often have a history of extensive sexual activity commencing in youth, a succession of sexual partners and a higher incidence of pelvic inflammatory disease. Two groups of younger women are likely to use oral contraceptives—those who already have had children and those who are exposed to a high risk of pregnancy and who wish to avoid it. Surely it is probable that the young women who have had vaginal cytological examinations in recent years would include a disproportionately large number of individuals in both of these categories, many of whom are being checked only because cervical smears are usually taken before oral contraceptives are prescribed.

It would be surprising, indeed, if one did not find an increase in both absolute and relative numbers of cervical epithelial abnormalities of significant type in women in the 20 to 30 year age group, for example, when these figures are compared with previously existing figures for the same age group. It may even be fair to suggest that oral contraceptives, as a result of associated routine cervical screening, have brought to light a large number of cases of cervical epithelial

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